

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Hang-Seok LEE, et al.

Serial No. 10/616,037

Filed: July 10, 2003

For: REFLECTIVE LIQUID CRYSTAL
DISPLAY AND DRIVING METHOD
THEREOF



Art Unit: 2629

Examiner: William Boddie

Confirmation No. 9800

Attorney Docket No. 277/011

TRANSMITTAL OF APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

This Appeal Brief is being filed in triplicate together with the fee as set forth in 1.17 (c) in the amount of \$500.00 covering the appeal fee. The Commissioner of Patents is hereby authorized to charge the necessary fees to our credit card. Attached is PTO form 2038.

Respectfully submitted,
LEE & MORSE, P.C.

Date: November 3, 2006


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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192

Commissioner for Patents
U.S. Patent and Trademark Office
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Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Date: November 3, 2006

Sir,

INTRODUCTORY COMMENTS

This is an appeal to the Board of Patent Appeals and Interferences from the decision of the Examiner of Group 2629 who, in an Office Action Made Final mailed on May 4, 2006 and an Advisory Action mailed on July 20, 2006, finally rejected claims 1, 3-8 and 10-13 in the above-identified application. Appellants respectfully request consideration of this Appeal Brief by the Board of Patent Appeals and Interferences for allowance of these claims in the above-identified application.

I. REAL PARTY IN INTEREST

The invention is assigned to Samsung Electronics Co., Ltd., 416 Maetan-Dong, Paldal-Gu, Suwon-City, Kyungki-Do, Republic of Korea.

II. RELATED APPEALS AND INTERFERENCES

To the best of appellants' knowledge, there are no prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF THE CLAIMS

Claims 1, 3-8 and 10-13 are currently pending in the subject application. Claims 1-11 were finally rejected in the May 4, 2006 Office Action Made Final. In the July 5, 2006 Amendment Under 37 C.F.R. § 1.116, Appellants amended claims 1 and 8 to respectively include features of dependent claims 2 and 9, cancelled claims 2 and 9, and added dependent claims 12 and 13. An Advisory Action mailed on July 20, 2006 stated that the July 5, 2006 Amendment would be entered for purposes of appeal, thus, claims 1, 3-8 and 10-13 are finally rejected. A copy of claims 1, 3-8 and 10-13 is set forth in the attached Claims Appendix.

Claims 1, 3-8, 10 and 11 are on appeal. Of these, claims 1 and 8 are independent claims. Of the dependent claims, claims 3, 5 and 12 directly depend from independent claim 1, claim 4 depends from claim 3, claims 6 and 7 depend from claim 5, and claims 10, 11 and 13 directly depend from claim 8.

IV. STATUS OF AMENDMENTS

On July 5, 2006, appellants filed a Reply under 37 C.F.R. § 1.116 in response to the May 4, 2006 Office Action Made Final. The July 5th Amendment amended claims 1 and 8 to respectively include features of dependent claims 2 and 9, cancelled claims 2 and

9, and added dependent claims 12 and 13. An Advisory Action mailed July 20, 2006 stated that the July 5, 2006 Amendment would be entered for purposes of appeal, thus, claims 1, 3-8 and 10-13 are finally rejected. As independent claims 1 and 8 were solely amended to include features of cancelled claims 2 and 9, respectively, claims 1, 3-8, 10 and 11 correspond to features previously considered by the Examiner. New dependent claims 12 and 13 have not been specifically addressed by the Examiner.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claims on appeal generally relate to a reflective liquid crystal display ("LCD") and a method of driving a reflective LCD. Claims 1 and 8 are the independent claims on appeal.

Claim 1 is directed to an LCD including an LCD panel having a plurality of color filters for selectively filtering white light, and a driver for driving the LCD panel, wherein *during non-display periods*, between the display periods during which a desired color may be displayed, the driver drives the LCD panel to display *white light and no light* at time *period(s) that are different and distinct from time period(s) of the non-display periods during which white light is displayed*.¹

Claim 8 is directed to a method of driving an LCD that includes driving the LCD panel *during non-display periods*, between display periods during which a desired color may be displayed, to display *white light and no light at time period(s) that are different*

¹ Claim 1 recites, in part: "wherein, during non-display periods between the display periods, the driver drives the LCD panel to display white light, wherein during non-display periods, the driver further drives the LCD panel to display no light at different, distinct time periods from when the LCD panel displays white light during non-display periods."

*and distinct from time period(s) of the non-display periods during which white light is displayed.*²

Embodiments of claims 1 and 8 drive the LCD panel during the non-display periods to display white light for one time period and to display no light during another time period that is different and distinct from the one time period. More particularly, in embodiments of claims 1 and 8, a non-display period includes a white display time period t_w and a no light display time period t_{off} , as illustrated in, e.g., FIG. 4 of appellants' originally filed specification.³ That is, a non-display period of a frame of an image signal includes at least one white display time period t_w and at least one no light display time period t_{off} .

Thus, embodiments of claims 1 and 8 may adjust and/or control a luminance of image(s) being displayed by controlling a length of each of a respective white display time period t_w and no light display time period t_{off} of the non-display period. During the no light display time period t_{off} , electric charges accumulated in the LCD panel during the white display time period t_w and during the display periods t_c may be discharged.⁴

The LCD and the method of driving an LCD respectively recited in claims 1 and 8 are advantageous over conventional LCDs and LCD driving methods at least by providing

² Claim 8 recites, in part: "during non-display periods between the display periods, driving the LCD panel to display white light; and during non-display periods at different, distinct time periods from displaying white light during the non-display periods, driving the LCD panel to display no light."

³ See, e.g., paragraph [0036] of the originally filed subject application, which states "Referring to FIG. 4 ... A non-display period includes " t_w " and " t_{off} ." Time " t_w " represents a part of the non-display period in which all of the color light are mixed to display white light. Time " t_{off} " represents the other part of the non-display period in which none of the colors of light are displayed."

⁴ See, e.g., paragraph [0036] of the originally filed subject application, which states "During time period " t_{off} " a reset step of discharging electric charges accumulated at the LCD panel 210 during time periods t_c or t_w is performed."

LCDs and a method of driving LCDs capable of displaying images with improved luminance. Reflective LCDs or transreflective LCDs operating in a reflective mode employ natural light to display images on the LCD panel. Generally, only a portion of the natural light incident thereon is reflected. In contrast, transmissive LCDs or transreflective LCDs operating in a transmissive mode transmit light from a light source to display images thereon. Thus, reflective or transreflective LCDs operating in a reflective mode may display images having relatively lower luminance than transmissive LCDs.

Embodiments of claims 1 and 8 drive the LCD panel during a non-display period to display white light at one time period of the non-display period and to display no light at another time period of the non-display period to improve the luminance of image(s) being displayed and to help normalize the liquid crystal for the subsequent display period during which the LCD panel may be driven to display a desired color by mixing a combination of light output by the plurality of color filters.

Thus, in comparison to conventional LCDs and LCD driving methods, embodiments of the claims 1 and 8 enable a luminance of an image(s) being displayed to be adjusted and/or controlled.⁵ Additionally, in contrast to conventional LCDs and LCD driving methods, embodiments of claims 1 and 8 separately provide an LCD and a method of driving an LCD capable of displaying an image(s) with a desired luminance without

⁵ See, e.g., paragraph [0048] of the originally filed subject application, which states “a reflective LCD according to an embodiment of the present invention is able to adjust the luminance according to circumstances.”

requiring a specific design for regulating a transmittance spectrum of a color filter and degrading the color purity of the image(s) being displayed.⁶

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,117,224 to Kawamura et al. ("the Kawamura et al. reference") in view of U.S. Patent No. 5,396,257 to Someya et al. ("the Someya et al. reference").

Cancelled claims 2 and 9, the features of which are now recited in claims 1 and 8, respectively, were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kawamura et al. reference in view the Someya et al. reference and further in view of U.S. Patent Publication No. 2001/0038371 to Yoshinaga et al. ("the Yoshinaga et al. reference").

Claims 3-5, 7 and 10-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kawamura et al. reference in view of the Someya et al. reference and further in view of U.S. Patent No. 5,841,492 to Iwauchi ("the Iwauchi reference").

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kawamura et al. reference in view of the Someya et al. reference in view of the Iwauchi reference and further in view of U.S. Patent No. 5,131,736 to Alvarez ("the Alvarez reference").

⁶ See, e.g., paragraph [0048] of the originally filed subject application, which states "A reflective LCD and the driving method thereof according to an embodiment of the present invention interposes periods of displaying white light between periods of displaying the desired color by mixing the red, green and blue light to obtain a desired luminance without a special design of the transmittance spectrum of the color filter."

Thus, each claim stands finally rejected on a single ground of rejection under 35 U.S.C. § 103(a).

For the purposes of this appeal, appellants present the following ground of rejection for review: whether claims 1 and 8 are unpatentable under 35 U.S.C. § 103(a) over the Kawamura et al. reference in view the Someya et al. reference and the Yoshinaga et al. reference.⁷

VII. ARGUMENT

The Examiner rejected the combination of features now recited in claims 1 and 8 as being unpatentable under section 35 U.S.C. § 103(a) over the Kawamura et al. reference in view of the Someya et al. and Yoshinaga et al. references. Appellants respectfully submit that this rejection is improper and should be overturned.

The law requires that the Examiner support a section 103(a) rejection by setting forth a *prima facie* case of obviousness.⁸ A *prima facie* case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art.⁹ The Examiner must show that all of the claim limitations are taught or suggested by the prior art.¹⁰ Further, the Examiner must show that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference

⁷ In view of the incorporation of the features of cancelled claims 2 and 9 into independent claims 1 and 8, appellants respectfully request consideration of the patentability of independent claims 1 and 8 over the combination of the Kawamura et al. reference in view the Someya et al. reference and the Yoshinaga et al. reference.⁷

⁸ *In re Deuel*, 51 F.3d 1552, 1557, 34 USPQ2d 1210, 1214 (Fed. Cir. 1995).

⁹ *In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529; (Fed. Cir. 1993), quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976).

or combine reference teachings to arrive at the claimed subject matter.¹¹ The requirement that there be a motivation to modify or combine reference teachings means that establishing a *prima facie* case of obviousness involves more than simply piecing together different elements of prior art references. The mere fact that references *can* be combined or modified is insufficient to establish motivation. Rather, the prior art must suggest the desirability of the modification or combination.¹²

Where, as here, the Examiner fails to establish a *prima facie* case of obviousness, appellants have no burden to rebut the obviousness rejection with evidence.¹³ If the examination at the initial stage does not produce a *prima facie* case of unpatentability, then, without more, appellants are entitled to grant of the patent.¹⁴

As part of the *prima facie* case that the Examiner is required to set forth when rejecting claims 1 and 8, the Examiner must show that one of ordinary skill in the art would, by reading the Kawamura et al., Someya et al. and Yoshinaga et al. references, find it obvious to provide an LCD and method for driving an LCD, as respectively recited in claims 1 and 8. However, appellants respectfully submit that the Examiner has failed to show that the combination of the Kawamura et al., Someya et al. and Yoshinaga et al. references discloses or suggests all of the elements recited claims 1 and 8, and has failed to show that the prior art suggests the desirability of modifying or combining the cited references.

¹⁰ *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

¹¹ *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

¹² *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

¹³ *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955 (Fed. Cir. 1993).

¹⁴ *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443 (Fed. Cir. 1992).

Appellants respectfully note that claim 1 recites an LCD and claim 8 recites a method of driving an LCD, wherein during non-display periods, the LCD panel is driven to display white light and no light at time period(s) of the non-display period different and distinct from time period(s) of the non-display period during which white light is displayed. Appellants respectfully submit that none of the Kawamura et al., Someya et al. and Yoshinaga et al. references, alone or in combination, disclose or suggest this feature of each of claims 1 and 8. For at least this reason, Appellants respectfully submit that the combination of the Kawamura et al., Someya et al. and Yoshinaga et al. references fails to disclose or suggest all of the elements of each of claims 1 and 8, and that one of ordinary skill in the art would not be motivated to modify or combine the cited references to arrive at the LCD and the method of driving an LCD, as recited and claimed in claims 1 and 8, respectively.

A. The Kawamura et al., Someya et al. and Yoshinaga et al. References Fail to Disclose or Suggest all of the Elements of Claims 1 and 8

Claims 1 and 8 each respectively recite an LCD and a method of driving an LCD, wherein *during non-display periods*, the LCD panel is driven to display white light and no light at time period(s) of the non-display period different and distinct from time period(s) of the non-display period during which white light is displayed. As discussed above, embodiments of claims 1 and 8 include a non-display period including a white display time period t_w and a no light display time period t_{off} , which is different and distinct from the white display time period t_w .

With regard to the Yoshinaga et al. reference, appellants respectfully submit that the Yoshinaga et al. reference fails to disclose or suggest an LCD and a method of driving an LCD, wherein during display periods, the LCD panel is driven to display a desired color

by mixing a combination of light output by the plurality of color filters, and during non-display periods, between the display periods, the LCD panel is driven to display white light and no light at different and distinct time periods of the non-display period during which white light is displayed. Appellants respectfully note that the Examiner also failed to identify any portion of the Yoshinaga et al. reference disclosing the display of white light during a non-display period, and instead only asserted that the Yoshinaga et al. reference discloses “inserting a black display period into a frame.”¹⁵ In particular, the Examiner asserted that the reset period operation, i.e., writing of a black image, of the Yoshinaga et al. corresponds to the display of “no light” in claims 1 and 8.¹⁶ Appellants respectfully disagree and submit that it is improper to even equate to “reset operation” of the Yoshinaga et al. reference with the “no display” feature of claims 1 and 8.

Appellants submit that in the Yoshinaga reference, the reset period occurs between each color transition, i.e., between the display of red and the display of green, and between the display of green and the display of blue.¹⁷ Thus, the “reset period” of the Yoshinaga et al. reference cannot correspond to the “no display” period of claims 1 and 8 at least because the “reset period” of the Yoshinaga et al. reference does not occur between display periods during which the LCD panel is driven to display a desired color by mixing a combination of light output by the plurality of color filters, as recited in claims 1 and 8.

¹⁵ May 4, 2006 Office Action Made Final, at page 4, paragraph no. 5, lines 9 and 10.

¹⁶ May 4, 2006 Office Action Made Final, at page 4, paragraph no. 5, lines 9 and 10.

¹⁷ See, FIG. 7 and paragraphs [0059] – [0063] of the Yoshinaga et al. reference.

Further, the Yoshinaga et al. reference is directed to a RGB field sequential display scheme or field sequential color scheme.¹⁸ More particularly, the Yoshinaga et al. reference is directed to a “*color filter-less*” liquid crystal display employing an RGB field sequential display scheme with color light sources 8R, 8G, 8B instead of color filters.¹⁹ Thus, not only does the “reset period” of the Yoshinaga et al. reference not correspond to the “no light” display of claims 1 and 8, the Yoshinaga et al. reference fails to disclose an LCD panel including “a plurality of color filters”, as recited in claims 1 and 8.

With regard to the Kawamura et al. reference, the Examiner acknowledged that the Kawamura et al. reference fails to disclose or suggest an LCD and a method of driving an LCD, wherein during non-display periods, the LCD panel is driven to display white light and no light at time *period(s) of the non-display period different and distinct from time period(s) of the non-display period during which white light is displayed*.²⁰ The Examiner relied on the Someya et al. reference for disclosing driving the LCD panel during non-display periods “to display white light” feature of claims 1 and 8. Appellants respectfully submit that the Examiner’s assertion that the white level (W) of the Someya et al. reference corresponds to the LCD panel being driven “to display white light” during non-display periods is improper.

With regard to the Someya et al. reference, appellants respectfully submit that in an attempt to normalize video signals among a plurality of display apparatus, i.e., CRTs, the

¹⁸ See, paragraph [0014] of the Yoshinaga et al. reference.

¹⁹ See, paragraphs [0012], [0014], [0059], [0100] and [0101] of the Yoshinaga et al. reference.

²⁰ May 4, 2006 Office Action Made Final, at page 3, paragraph no. 4, lines 9-10.

Someya et al. reference may insert a reference voltage in the blanking interval.²¹ The reference voltage (B/W) of the Someya et al. reference is a signal in which the white level (W) and the black level (B) are *alternated at intervals of one horizontal period 1H* of the video signal. Thus, in the blanking interval of the video signal, the reference voltage of the white level (W) and the reference voltage of the black level (B) are alternately inserted at intervals of 1H.²² More particularly, as illustrated in FIG. 24 of the Someya et al. reference, the black level (B) and the white level (W) are alternately inserted at intervals of 1H, i.e., horizontal period. Thus, the Someya et al. reference fails to disclose or suggest driving an LCD panel during a non-display period to display *white light* and to display *no light* at a time period different and distinct from a time period during which white light is displayed during the non-display period, as recited in claims 1 and 8.

Accordingly, even assuming one of ordinary skill in the art would not have been motivated at the time of appellants' invention to combine the teachings of the Someya et al. reference with the Kawamura et al. reference and/or the Yoshinaga et al. reference, the Someya et al. reference fails to overcome the deficiencies of the Kawamura et al. reference and the Yoshinaga et al. reference, as applied to claims 1 and 8. Thus, even assuming persons of ordinary skill in the art at the time of appellants' invention would be motivated to combine the teachings of the applied references as asserted by the Examiner,²³ the combination of the Kawamura et al., the Someya et al. and the Yoshinaga et al. references fails to disclose or suggest each and every element of claims 1 and 8 at least because none

²¹ See, col. 18, lines 49-51 of the Someya et al. reference.

²² See, col. 18, lines 61-65 of the Someya et al. reference.

of the Kawamura et al., Someya et al. and the Yoshinaga et al. references disclose or suggest driving an LCD panel during a non-display period to display *white light* **and** to display *no light* at a time period different and distinct from a time period during which white light is displayed during the non-display period, as recited in claims 1 and 8.

Moreover, it is apparent that the Examiner is using hindsight reconstruction to assemble pieces of various prior art references in an attempt to recreate the non-display periods recited in claims 1 and 8, without regard to nature of each prior art reference. This is clearly improper. Further, as noted above, the law requires that the prior art of record provide some motivation for modifying the references in the manner suggested by the Examiner.

B. The Prior Art of Record Fails to Suggest the Desirability of Modifying the Cited References in the Manner Suggested by the Examiner to Arrive at the Subject Matter of Claims 1 and 8

As noted above, not only must the Examiner show that all of the claim limitations are taught or suggested by the prior art, the Examiner must also show that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or combine reference teachings to arrive at the claimed subject matter. Appellants respectfully submit that none of the cited prior art references relied upon by the Examiner, whether taken alone or in combination, suggest the desirability of modifying the prior art to arrive at the LCD recited in claim 1 and the method of driving an LCD recited in claim 8. In particular, appellants respectfully submit that the prior art of record fails to suggest an LCD and a method of

²³ May 4, 2006 Office Action Made Final, at page 3, paragraph 3, lines 14-25, and at page 4, paragraph 5,

driving an LCD including an LCD panel having a plurality of color filters, wherein, during a non-display period between the display periods during which a desired color is displayed by mixing a combination of light output by the plurality of color filters, the driver drives the LCD panel to display *white light* and *no light* at different, distinct time periods of the non-display period during which white light is displayed.

With regard to the Kawamura et al., the Someya et al. and the Yoshinaga et al. references, the Examiner has broadly stated that:

“Someya, Kawamura, Yoshinaga are all analogous art because they are from the same field of endeavor namely, display driver control of displays including LCD displays.”²⁴

“At the time of the invention it would have been obvious to one of ordinary skill in the art to alternate the blanking period of Kawamura with the white/black reference voltage taught by Someya. The motivation for doing so would have been to achieve luminance shading and color sharing (Someya; col. 2, lines 63-68) and also to simply increase the luminance of the display.”²⁵

“At the time of the invention it would have been obvious to one of ordinary skill in the art to include a black display period, taught by Yoshinaga, in addition to the white display period, taught by Someya, in the non-display period of Kawamura. The motivation for doing so would have been to reset the pixel, and allow for faster adjustment amongst transmission levels within the pixel.”²⁶

Appellants submit that the Kawamura et al. reference is directed to a method of driving a liquid crystal panel having color filters, wherein height differences between the color filters may be reduced without deteriorating light transmittivity.²⁷ In an attempt to avoid deterioration of light transmittivity while reducing height differences between the

lines 11-21.

²⁴ May 4, 2006 Office Action Made Final, at page 3, paragraph 3, lines 15-16 and at page 4, paragraph 5, lines 11-13.

²⁵ May 4, 2006 Office Action Made Final, at page 3, paragraph 3, lines 14-25.

²⁶ May 4, 2006 Office Action Made Final, at page 4, paragraph 5, lines 11-21

color filters, the Kawamura et al. reference provides a driving scheme including a video signal display period T1 and a non-display period T2.²⁸ During the non-display period, e.g., vertical blanking period, of the Kawamura et al. reference, the data controller 11 selectively outputs the no-control bias data RD, GD and BD by means of a data output control signal VDO.²⁹ The no bias control data RD, GD and BD specify effective voltage values in the no-bias interval for each of the R, G and B signals based on the amount of the height difference reduced between the color filters FR, FG and FB.³⁰ As illustrated in FIGS. 8A – 8F, the time period during which each of the control data RD, GD and BD is high or low during the non-display period may be different and the drive voltages for the R, B and B segment electrodes may be independently set in an attempt to compensate for the reduction in height differences between the color filters.³¹ Thus, as discussed above, the Kawamura et al. reference fails to disclose or suggest an LCD and a method of driving an LCD wherein, during the non-display periods, the LCD panel is driven to display *white light and no light* at time periods of the non-display periods *different from when the white light is displayed*, as recited in claims 1 and 8.

Appellants submit that the Someya et al. reference is directed to a multiscreen display apparatus in which one large screen is formed by combining screens of a plurality of display units.³² More particularly, the Someya et al. reference is directed to a

²⁷ See, Abstract, col. 2, lines 57-63 and col. 3, lines 13-17 of the Kawamura et al. reference.

²⁸ See, col. 6, lines 4-11 of the Kawamura et al. reference.

²⁹ See, col. 6, lines 25-32 of the Kawamura et al. reference.

³⁰ See, col. 4, lines 10-20 of the Kawamura et al. reference.

³¹ See, col. 6, lines 49-61 and col. 7, line 52 – col. 8, line 6 of the Kawamura et al. reference.

³² See, Abstract of the Someya et al. reference.

multiscreen display apparatus capable of reducing the luminance shading and color shading between a plurality of display units by providing data converters for electrically correcting video signals respectively for respective cores, i.e., CRTs, connecting respective data converters to one computer control device, and controlling data conversion methods of respective data converters via the computer control device so as to remove luminance shading from each core, i.e., CRT.³³ Further, the Someya et al. reference only refers to “liquid crystal display elements” in a blanket paragraph stating that “it is evident that a television set of CRT direct view type and a projection television using liquid crystal display elements also have similar effects.”³⁴ Appellants respectfully submit that persons of ordinary skill would appreciate that the Someya et al. reference is directed to a data converter that may be employed to help normalize video signals among a plurality of separate display apparatus, i.e., a plurality of separate CRTs.

In view of the foregoing, appellants respectfully disagree with the Examiner’s broad assertion that “at the time of the invention it would have been obvious to one of ordinary skill in the art to alternate the blanking period of Kawamura with the white/black reference voltage taught by Someya. The motivation for doing so would have been to achieve luminance shading and color sharing (Someya; col. 2, lines 63-68) and also to simply increase the luminance of the display.”³⁵

Appellants respectfully submit that persons of ordinary skill in the art at the time of the invention would not have been motivated to combine the teachings of the Someya et al.

³³ See, col. 2, lines 39-51 of the Someya et al. reference.

³⁴ See, col. 15, lines 17-25 of the Someya et al. reference.

³⁵ May 4, 2006 Office Action Made Final, at page 3, paragraph 3, lines 14-25.

reference directed to data converters for controlling a large screen formed by a plurality of display units, i.e., CRTs³⁶ with the teachings of the Kawamura et al. reference directed to a method of driving a liquid crystal panel having color filters, wherein height differences between the color filters may be reduced without deteriorating light transmittivity.³⁷ Appellants respectfully note that col. 2, lines 63-68 of the Someya et al. reference, which was cited by the Examiner should be considered in the *context* clearly set forth therein, i.e., a “multiscreen display apparatus free from luminance shading and color shading between a plurality of cores” ... “using CRTs as cores.”³⁸

Further, in view of the foregoing, appellants respectfully disagree with the Examiner’s broad assertion that “at the time of the invention it would have been obvious to one of ordinary skill in the art to include a black display period, taught by Yoshinaga, in addition to the white display period, taught by Someya, in the non-display period of Kawamura. The motivation for doing so would have been to reset the pixel, and allow for faster adjustment amongst transmission levels within the pixel.”³⁹

Appellants submit that the Yoshinaga et al. reference is directed to a RBG field sequential display scheme or field sequential color scheme.⁴⁰ More particularly, the Yoshinaga et al. reference is directed to a “*color filter-less*” liquid crystal display employing an RGB field sequential display scheme with color light sources 8R, 8G, 8B

³⁶ See, Abstract of the Kawamura et al. reference.

³⁷ See, Abstract, col. 2, lines 57-63 and col. 3, lines 13-17 of the Kawamura et al. reference.

³⁸ See, col. 2, lines 63-68 of the Someya et al. reference.

³⁹ May 4, 2006 Office Action Made Final, at page 4, paragraph 5, lines 11-21.

⁴⁰ See, paragraph [0014] of the Yoshinaga et al. reference.

instead of color filters.⁴¹ Thus, the Yoshinaga et al. reference fails to disclose an LCD panel including “a plurality of color filters,” as recited in claims 1 and 8. One of ordinary skill in the art at the time of appellants’ invention would not have been motivated to combine the teachings of the Yoshinaga et al. reference directed to a **“color filter-less” display** with the teachings of the Kawamura et al. reference directed to a method of driving **a liquid crystal panel having color filters**, wherein height differences between the color filters may be reduced without deteriorating light transmittivity and/or with the teachings of the Someya et al. reference directed to **data converters for controlling a large screen formed by a plurality of display units, i.e., CRTs**.⁴²

Further, as discussed above, even assuming one of ordinary skill in the art would be motivated to combine the teachings of the Yoshinaga et al. reference with the Someya et al. reference and/or the Kawamura et al. reference, the “reset period” of the Yoshinaga et al. reference not correspond to the “no light” display of claims 1 and 8. As discussed above, in the Yoshinaga reference, the reset period occurs between each color transition, i.e., between the display of red and the display of green, and between the display of green and the display of blue.⁴³ Thus, the “reset period” of the Yoshinaga et al. reference cannot correspond to the “no display” period of claims 1 and 8 at least because the “reset period” of the Yoshinaga et al. reference does not occur between display periods during which the LCD panel is driven to display a desired color by mixing a combination of light output by the plurality of color filters, as recited in claims 1 and 8.

⁴¹ See, paragraphs [0012], [0014], [0059], [0100] and [0101] of the Yoshinaga et al. reference.

⁴² See, Abstract, col. 2, lines 57-63 and col. 3, lines 13-17 of the Kawamura et al. reference.

⁴³ See, FIG. 7 and paragraphs [0059] – [0063] of the Yoshinaga et al. reference.

In view of the foregoing, appellants respectfully submit that the cited prior art references, whether taken alone or in combination, fail to suggest the desirability of providing an LCD and a method of driving an LCD including an LCD panel having a plurality of color filters, wherein, *during non-display periods*, between display periods, the LCD panel is driven to display *white light* and *no light* at time periods *distinct and different from when the LCD panel displays white light during the non-display periods*, as recited in claims 1 and 8, respectively.

CONCLUSION

Appellants respectfully submit that the rejections of claims 1, 3-8 and 10-13 under 35 U.S.C. § 103(a) over the cited prior art references are improper and should be overturned. The Examiner failed to set forth a *prima facie* case of obviousness for at least the reasons that the cited prior art references fail to disclose or suggest each and every element of the claimed subject matter, and, moreover, there is no suggestion in the prior art of record that the cited references should be modified in the manner proposed by the Examiner.

Accordingly, appellants respectfully submit that the rejections of claims 1, 3-8 and 10-13 are improper, and respectfully request that the rejections be reversed.

Respectfully submitted,

LEE & MORSE, P.C.

Date: November 3, 2006


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PETITION and
DEPOSIT ACCOUNT CHARGE AUTHORIZATION

This document and any concurrently filed papers are believed to be timely. Should any extension of the term be required, appellant hereby petitions the Director for such extension and requests that any applicable petition fee be charged to Deposit Account No. 50-1645.

If fee payment is enclosed, this amount is believed to be correct. However, the Director is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-1645.

Any additional fee(s) necessary to effect the proper and timely filing of the accompanying-papers may also be charged to Deposit Account No. 50-1645.

VIII. CLAIMS APPENDIX

The pending claims as they stand on appeal are presented in a listing of the claims, below. Claims 1, 3-8 and 10-13 are currently pending in the subject application. Claims 1 and 8 are independent claims.

Listing of the Claims:

1. (Previously Presented) A liquid crystal display (LCD), comprising:
an LCD panel having a plurality of color filters to selectively filter white light; and
a driver for driving the LCD panel, wherein, during display periods, the driver drives the LCD panel to display a desired color by mixing a combination of light output by the plurality of color filters, and, wherein, during non-display periods between the display periods, the driver drives the LCD panel to display white light, wherein during non-display periods, the driver further drives the LCD panel to display no light at different, distinct time periods from when the LCD panel displays white light during non-display periods.
2. (Cancelled)
3. (Original) The LCD according to claim 1, wherein the plurality of color filters are transmissive color filters attached to an upper portion of the LCD panel.
4. (Original) The LCD according to claim 3, further comprising a reflecting plate.
5. (Original) The LCD according to claim 1, wherein the plurality of color filters are reflective color filters attached to a lower portion of the LCD panel.

6. (Previously Presented) The LCD according to claim 5, wherein the plurality of color filters of the reflective color filter are made of photonic crystals, which are alternate arrays of dielectrics.

7. (Previously Presented) The LCD according to claim 5, wherein the plurality of color filters of the reflective color filter are made of dielectrics having different indices of refraction.

8. (Previously Presented) A method for driving a liquid crystal display (LCD) including an LCD panel having a plurality of color filters to selectively filter white light, the method comprising:

driving the LCD panel during display periods to display a desired color by mixing a combination of light output from the plurality of color filters; [[and]]

during non-display periods between the display periods, driving the LCD panel to display white light; and

during non-display periods at different, distinct time periods from displaying white light during the non-display periods, driving the LCD panel to display no light.

9. (Cancelled)

10. (Original) The method according to claim 8, wherein the plurality of color filters are transmissive color filters attached to an upper portion of the LCD panel.

11. (Original) The method according to claim 8, wherein the plurality of color filters are reflective color filters attached to a lower portion of the LCD panel.

12. (Previously Presented) The LCD according to claim 1, wherein the LCD panel is driven to display no light during each non-display period between each of the display periods during which the desired color formed by mixing a combination of light output by the plurality of color filters is displayed.

13. (Previously Presented) The method according to claim 8, wherein the LCD panel is driven to display no light during each non-display period between each of the display periods during which the desired color formed by mixing a combination of light output by the plurality of color filters is displayed.

IX. EVIDENCE APPENDIX

Appellants make no reference to evidence.

X. RELATED PROCEEDINGS APPENDIX

To the best of appellants' knowledge, there are no prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by, or have a bearing on the Board's decision in the pending appeal.